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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/714,213	11/13/2003	Joseph D. Rigney	041A.0006.U1(US)	2546
29683	7590	06/01/2005	EXAMINER	
HARRINGTON & SMITH, LLP 4 RESEARCH DRIVE SHELTON, CT 06484-6212			BAREFORD, KATHERINE A	
			ART UNIT	PAPER NUMBER
			1762	
DATE MAILED: 06/01/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/714,213

Applicant(s)

RIGNEY ET AL.

Examiner

Katherine A. Bareford

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 4/25/05.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>4/25/05, 4/28/05</u> | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

The amendment of April 25, 2005 has been received and entered.

### *Double Patenting*

1. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

2. Claims 1-4, 7-8 and 11 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-4, 7-8 and 11 of copending Application No. 10/714,430. Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims of '430 have the same requirements of the respective claims of the present application, except that the claims of '430 use a NiAl coating instead of a "bond coating" as in the present application. However, the NiAl acts as a specific bond coating and thus, the claims of '430 provide all of the features required by the claims of the present application.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

3. This provisional rejection is maintained, as applicant has provided no arguments against the rejection in the amendment of April 25, 2005.

*Drawings*

4. The replacement sheet of drawings containing figures 1-2 was received on April 25, 2005. These drawings are approved.

*Claim Rejections - 35 USC § 112*

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claim 12 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 12, it is unclear what "M" is required to be.

--- In the amendment of April 25, 2005, applicant argues that the expression "M Cr Al Y bond coating" is a well known expression, and examples of what M can be are

expressly set forth on page 2, lines 4-7 of the application, and therefore, one of ordinary skill in the art would understand the full scope of claim 12.

The Examiner has reviewed this argument, however, the rejection is maintained. While applicant argues that the term is well known and the scope of M would be well known, no objective evidence is provided as to this fact or to what the full scope of M would be. If applicant means that the scope of M is that described on page 2, lines 4-7, then applicant should insert this definition of M in the claim. If the scope is different, it is unclear what the scope would be.

*Claim Rejections - 35 USC § 103*

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. Claims 1-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Draghi et al (US 5972424) in view of Arnold (US 6049978) and Beverly et al (US 6074706).

Claim 1: Draghi teaches, in the Background Art section, a conventional method of repairing a coated component that has been exposed to engine operation. Column 1, line 10 through column 2, line 20. An engine run component with a base metal substrate is provided. Column 1, lines 40-65. The component has a thermal barrier coating system comprising a bond coat on the base metal and a top ceramic thermal barrier coating. Column 1, lines 30-40. The applied ceramic coating would have a thickness, which can be considered " $t$ ". Draghi teaches to remove the thermal barrier coating system. Column 1, lines 45-65. In the removal, a portion of the base metal substrate is also removed, indicating the complete removal of the thermal barrier coating system. Column 1, lines 55-65. This removed amount would have a thickness, which can be considered " $\Delta t$ ". The substrate, with the coating removed, is inspected to see if recoating is acceptable. Column 1, lines 60-65. If so, a bond coat is reapplied to the substrate as part of the repair. Column 2, lines 1-20. Then a top ceramic coating is applied to the bond coat. Column 2, lines 10-20. Following repair, the parts are inspected again to determine if they are acceptable to return to service. Column 2, lines 10-20.

Claim 2: the component can be a high pressure turbine blade. Column 1, lines 10-30.

Claim 5: the bond coats can be diffusion aluminide. Column 1, lines 25-30 and column 5, line 60 through column 6, line 5.

Claim 6: Draghi indicates that when using diffusion aluminide bond coatings, they can be simple aluminide or modified aluminide. Column 5, line 60 through column 6, line 5.

Claims 7-8: Draghi indicates the base metal of such components can be a nickel based superalloy. See column 5, lines 10-20.

Claim 9: Draghi indicates that when using diffusion aluminide bond coatings, they can be modified with noble metals, which would include Pt and Pd. Column 5, lines 60 through column 6, line 5.

Claim 10: Draghi teaches that the bond coat can contain M Cr Al Y and diffusion aluminide and other elements such as Si, Hf, Ta and Re. Column 6, lines 1-10.

Claim 11: Draghi indicates that the ceramic thermal barrier coating can be yttria stabilized zirconia. Column 7, lines 20-30.

Claim 12: Draghi indicates that the bond coat can be M Cr Al Y. Column 1, lines 25-30 and column 5, line 60 through column 6, line 5.

Claims 13 and 19: Draghi provides a process as discussed with regard to claim 1 above. Furthermore, the substrate can be a high pressure turbine blade. Column 1, lines 10-30. The substrate of such blades can be nickel based alloy. Column 5, lines 10-20. The bond coating can be a diffusion bond coat. Column 1, lines 25-30 and column 5, line

60 through column 6, line 5. The ceramic top coat can be ytteria stabilized zirconia.

Column 7, lines 20-30.

Claims 16-18: the component can be an airfoil (turbine blade) or static component, such as a turbine vane. Column 1, lines 25-30.

Draghi teaches all the features of these claims except (1) the precise thickness of the reapplied coatings, (2) the restored conditions (claim 2), (3) the weighing (claim 3), (4) the bond coat thickness and  $\Delta t$  (claim 4), (5) superalloy features (claims 7,8), (6) the densities (claims 14, 15).

However, Arnold teaches that when repairing turbine engine parts, one must clearly determine the dimensional difference between pre-repaired dimensions and the desired post-repair dimensions. Figure 1(a) and column 14, lines 5-15. One must determine a buildup thickness of coating material required to obtain the desired post repair dimensions. Figure 1(a) and column 14, lines 10-15. Prior to determining the pre-repaired dimensions, a previously applied protective coating must be removed. Figure 1(a) and column 14, lines 30-40. Multiple layers of coating can be applied, taking into account the desired post-repair dimensions. Column 14, lines 30-40. The part can be a nickel based superalloy. Column 14, lines 50-60.

Beverley teaches a method of applying thermal barrier coatings to turbine components. Column 1, lines 5-10. The substrate can be a nickel based superalloy. Column 1, lines 15-25. The substrate can be single crystal or directionally solidified. Column 1, lines 15-25. A bond coat is applied to the substrate. Column 4, lines 1-10.



The bond coat can be diffusion aluminide or M Cr Al Y alloys. Column 4, lines 5-10. A ceramic top layer is applied over the bond layer on the substrate. Column 4, lines 1-15. The ceramic can be yttria stabilized zirconia. Column 4, lines 5-15. The bond coat is applied in a uniform fashion to a thickness of 0.001 to about 0.005 inch (1 to 5 mils). Column 5, lines 1-15. As is shown by figure 2, the bond coat is applied in a uniform fashion, while the ceramic coat can have varying thicknesses, due to the groove in the substrate. See figure 2 and column 5, lines 1-15.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Draghi to perform inspections and measurements to determine how much coating materials need to be applied to the substrate to achieve the desired post repair dimensions from the time of removal of the coating and part of the substrate as suggested by Arnold so as to provide a desirable repaired part, because Draghi teaches to perform inspections after coating removal and following repair to determine if the parts are acceptable to return to service and Arnold teaches the importance of performing inspections and measurements to determine how much coating materials need to be applied to the substrate to achieve the desired post repair dimensions from the time of removal of the coating and part of the substrate to the time coating application has occurred. It would have been suggested that the post repair dimensions should be about the same as the original dimensions of the turbine component, since the part is to be returned to the service for which it would originally used. It would further have been obvious to modify Draghi in view of Arnold to

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provide the bond coat thickness about the same as the thickness previously applied and the ceramic coat to be applied to a thickness of  $t + \Delta t$  as suggested Beverley so as to provide a component of original dimensions, because Draghi in view of Arnold teach removal of coating, repair and inspection and reapplication of coating to provide a part of original dimensions, and Beverley teaches that it is desired for bond coats to be applied in a narrow range of thicknesses and the top ceramic coat, on the other hand, can be provided at a variety of thicknesses. It would further have been obvious to weigh the component to determine the amount of coating to apply, because the weight of specific coating materials would parallel the amount of coating to be applied. As to the specific  $\Delta t$  used, it would be a matter of routine experimentation to optimize the thickness to be removed, based on the desired amount that optimizes removal of the top coatings. As to the use of the specific bond coating thicknesses and specific superalloy, Beverley teaches that a 5 mil bond thickness and single crystal or directionally solidified substrate are desirable features to use when providing turbine components with thermal barrier coatings. As to the densities, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the references to optimize the densities of the materials, given that the references teach the use of the nickel based superalloy and the yttria stabilized zirconia and that Draghi teaches that various application methods can be used to give the desirable porosity of coating (column 7, line 65 through column 8, line 5) and Arnold teaches that various pressure treatments can be applied to the substrate.

*Response to Arguments*

10. Applicant's arguments filed April 25, 2005 have been fully considered but they are not persuasive.

**Applicant's Arguments**

Applicant argues that the combination of references fails to provide that the thermal barrier coating (TBC) system is completely removed during the repair process, which is required by the claims as now worded. Applicant argues that the primary reference to Draghi does not teach or suggest the complete removal of the TBC system, but rather teaches away from such a process. In the Draghi process, it is important that at least some bond coat remain in order to practice the invention. Draghi clearly indicates the critical importance of not removing the entire original bond coat from the component, since it is taught that the invention cannot be used in repairing the component if such is the case. Moreover, Draghi teaches in the Background section, several specific drawbacks of removing the entire TBC system. Thus, one of skill in the art combining Draghi with Arnold and Beverly would arrive at a method of repairing a component which would require that at least 1 mil of the original bond coat not be removed. Applicant also notes page 14, lines 18-23 of the present specification, as mentioning how the presently claimed invention produces surprising results in contrast to prior teachings.

**The Examiner's Response**

The Examiner has reviewed applicant's arguments, however, the rejection is maintained. While the process of the invention described in Draghi is directed to a repair process where all of the bond coating is not removed, Draghi does not teach away from providing a process where all the bond coating is removed. In the Background section of Draghi, Draghi indicates that when repairing TBC coated components, it is well known to remove all of the coating system, including both ceramic and metallic coatings (see column 1, lines 40-68). Furthermore, while Draghi provides specific drawbacks associated with the removal of all of the TBC coating system, Draghi also teaches that this type of repair has been used successfully in many instances (see column 2, lines 15-20). As well, when describing the process of Draghi, Draghi teaches that if there is insufficient bond coating remaining after the stripping process, "the blade 18 may not be repaired with the method of the present invention, but may possibly be repaired with a conventional procedure in which the bond coat 12 is also removed from the blade" (see column 4, lines 24-28). As a result, it would be very clear to one of ordinary skill in the art that when repairing TBC coated components, it is well known to remove all of the TBC coating system and that an acceptable repair can be made using such a process. As a result, the combination of the references would provide that a desirably repaired component can be provided with a process where all of the TBC coating system is removed. As to the teaches of page 14, lines 18-23 of the specification, it is the Examiner's position that all of the features of the claims as worded are suggested by the combination of references as provided in the

rejection above. Thus, the provided thickness would inherently increase engine efficiency as described at page 14.

### *Conclusion*

11. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.


12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Katherine A. Bareford whose telephone number is (571) 272-1413. The examiner can normally be reached on M-F(6:00-3:30) with the First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and for After Final communications.

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Other inquiries can be directed to the Tech Center 1700 telephone number at (571) 272-1700.

Furthermore, information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
**KATHERINE BAREFORD**  
**PRIMARY EXAMINER**